

# THE SCIENCE NEWS-LETTER

*A Weekly Summary of Current Science*

EDITED BY WATSON DAVIS

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## CORN-LIKE PLANT IN COAL REVOLUTIONIZES BOTANICAL HISTORY

Discovery of the stem of a plant similar to that of a corn stalk in a lump of limestone found imbedded in a coal seam in Illinois has changed hitherto accepted ideas of plant evolution and pushed the mystery of the origin of flowering plants millions of years further back into the geological past. Prof. A. C. Noe, paleobotanist for the University of Chicago, unearthed the revolutionary evidence after a systematic search.

The strata from which he obtained the limestone lump or "coal ball" was identified as belonging to the Carboniferous or Great Coal Age of the Paleozoic era, the next to the oldest of the four great geological time divisions which contain the fossil record of the past life on the earth. He classified the fossil stem as that of an angiosperm, or a flowering plant which had its seed enclosed in a seed-container, as are the seeds of our apple, rose, and oak.

No flowering plants of this sort have heretofore been proved to have grown so far back as this period of ancient geological times. The specimens previously reported of land plants with such a highly organized structure have been found in parts of the earth's crust formed during the Mesozoic era or geological middle ages, millions of years nearer to the present time.

Botanists have assumed from such evidence that the flowering plants had just begun to appear about the later part of the age when the plants that form our coal flourished. They have expected to find the more primitive flowering plants at this earlier time. Prof. Noe's discovery in the coal measures of a plant representing what has been taken to be a far advanced stage in plant evolution indicates that land plants must have gone through an enormously long period of development before the earliest period recorded in the fossil rocks.

The plant stem was found by cutting into a lump of limestone dug out of a coal seam and was classified after examination of a cross section under the microscope. Prof. Noe made a systematic search of coal beds in Illinois and Kentucky for these hard, black, fossil limestone lumps or coal balls which have hitherto not been found in this country. Since his initial discoveries these fossil balls have also been found in Texas and Indiana.

A large number of coal balls have been found in England, France, and Moravia since the middle of the nineteenth century and the entire knowledge of plant form and structure during the times of coal formation has hitherto been obtained from these European discoveries.

Prof. Noe, who is now in the field examining other specimens of coal balls, declared in a statement to Science Service that "probably the near future will bring about many new discoveries in fossil plants morphology from American coal balls". He is anxious to learn of the discovery of such coal balls in American mines.

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#### PLANT HUNTER CAUSES STIR IN BACKWOODS OF CHINA

Description of scenery never before beheld by white men and the stir created by the first foreigner ever seen by a mob in the backwoods of China are told by J. F. Rock, one of Uncle Sam's agricultural explorers, seeking new trees and flowers to enrich American farms and gardens. In a report to the Bureau of Plant Industry of the U. S. Department of Agriculture sent from Yunlungchou, China, he writes:

"I finally reached Yunlungchou, the Dragon Cloud City situated on the Hpi Kiang. The trip to this place was a revelation to me. I went by a hitherto untrodden path, and path it may well be called, for we had great difficulty in getting our mules and loads across, and many times the loads had to be carried by men over dangerous places. I think that no one living can imagine the grandeur of the scenery and terribleness of the road, unless he has actually seen and experienced it. On the 19th of March I crossed from the Salwin Watershed to that of the Mekong over mountains, the grandeur of which words cannot picture. The trail crossed the Mekong Watershed at 11,800 feet over snow and through fir forests with bamboo canebrake. I got some beautiful photos, showing those mighty monarchs of the forest and the depths of the Mekong Valley. The trail leading down into the very canyon of the Mekong is like a spiral stairway, - such curves and steepness that at the angles the levels of the road differ fifteen feet. You can imagine what these turns are, and you look down 7,000 feet. It takes steady nerves and good hobnailed shoes to stick to that trail. I wish you could have seen the rhododendrons, beautiful, gorgeous, all colors of the rainbow, many not in flower, as it is still early for them at such heights. Now, thanks to the gods, we have crossed all the mighty rivers which flow close together in tremendous chasms. The depths of the chasms increase farther north as the mountains increase in height. We crossed the Salwin at Hsuehshanting ('Snow-mountain peak') at 11,000 feet, descended over precipitous spurs and ridges down to 2,300 feet elevation and stopped at a place called Kantinggai. The tropical heat was intense, and, since I have been living at such high altitudes, I felt it very much indeed. There is no bridge over the Salwin, and we crossed, mule, loads, men, etc., in a ferry, taking three hours to do it. Then came an ascent the steepness of which beggars description, limestone bluffs with loose boulders, with burning grass everywhere which made the heat still more intense. These fires are started by hill tribes such as the Lolos, Minchias and Miaos whom the Chinese have driven into the hills where they eke out a precarious existence. I have found the people on this trip very civil, indeed, quite friendly. I only wish you could have had a glimpse of us all as we entered the hamlet of Wamangai, at the foot of some mighty limestone crags in a narrow canyon. It happened to be market day, and there were about 300 extra people in the place, mostly tribes people from the hills, in various costumes.

As we approached, we were soon surrounded by a mob and progress was almost impossible. It was, however, a good-natured mob which had never seen a foreigner. We went to a small temple of which this village boasts, followed by the mob. There was not a soul on the market and the open space in front of the temple was one seething mass of humanity; head on head they stood and from the temple steps I took two pictures of them. The worst was that they remained. The temple was one, narrow, long, dark room with a row of fierce-looking gods on an earthen brick shelf; the front was one row of wooden doors, all latticed. Through every hole of the lattice work there peeped a face, and they strained their eyes and necks to get a glimpse of me. I felt like an animal in a zoo. There was no place to hide, and so I escaped and wandered about among the groves on the neighboring hillsides, until such time as I thought that at least the visiting crowd had gone home to their mountain fastnesses. When I returned I found the two village headmen had brought presents of red hill rice, a ham, and a smoked front leg of a pig. I returned the compliment with two tins of condensed milk. I suppose they like the tin can better than the milk.

"We were off at daybreak and spent the next night at a place called Tsaochiang, elevation 8,000 feet. In front of us was the mighty Mekong Range, snow covered in its upper slopes. As already stated we crossed it at 11,800 feet elevation, wading through deep snow and through graceful, slender bamboo forest, with rhododendrons and mighty fir trees. Below the fir belt was the most glorious Tsuga forest I have ever seen in all my life, - snow in patches everywhere. The somberness of the forest was somewhat brightened by beautiful rhododendrons. A thousand feet below the summit we found a tiny temple amidst a huge grove of these mighty Tsuga trees 4 feet in diameter. Here I stopped for lunch; the air was most invigorating, and the scenery indescribably beautiful, - a place for gods to dwell in. I went to a quiet spot in the forest (for our caravan had arrived and was - as usual - noisy) and there I gorged myself on the wonderful scenery, - deep, deep down below the Mekong, a narrow brown band, above me the snow-covered crest of the Mekong prison range, its sides extending in precipitous buttresses to the depths below, tree on tree, like the masts of ships in a crowded harbor, - the mighty snow-capped peaks in the distant north glittering in the sunlight, and there I thanked the gods for being alive, well, and able to enjoy the glories of nature.

"Tomorrow we are off for Chienchuan, a six days' journey, and thence it will only take two days to Likiang to my base camp. From here on it is unsurveyed territory, and the map is a big blank. More revelations to come."

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## NEWS OF THE STARS

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### Milky Way Now Arches Across Evening Skies

By Isabel M. Lewis,  
U. S. Naval Observatory

The most conspicuous object in the heavens on clear summer evenings when there is no moonlight to dim its brightness is that irregular, luminous belt of countless faint stars familiarly known as the Milky Way or Galaxy. Rising above the horizon at a point nearly due north in the latter part of July it sweeps through the northern constellation of Cassiopeia, shaped like a huge W, and the less conspicuous group of stars known as Cepheus, to the Northern Cross in Cygnus now high in the northeast. Cygnus is one of the most beautiful and interesting constellations of



the northern hemisphere and it will remain visible far into the fall.

Some of the densest star fields of the Milky Way and some of the most intricate and beautiful gaseous nebulae of the heavens, both luminous and dark are to be found in this constellation. Here lies the so-called Network Nebula, a filmy cloudlike structure of enormous extent that human eye has never seen except photographically since it is so faint that only hours of exposure of the photographic plates with the most powerful telescopes will bring it into view.

In Cygnus the Milky Way separates into two distinct branches. One of these passes through the constellation of Aquila, The Eagle, which contains the brilliant first-magnitude star Altair flanked on either side by a star of lesser brightness, the three lying nearly in a straight line. From this point the course of this branch of the Milky Way extends in a southwesterly direction to the constellation of Sagittarius with its many bright stars, some of them forming a characteristic little dipper with its bowl turned toward the southern horizon. The second branch of the Milky Way leads from Cygnus through the eastern part of the huge and rambling constellation of Ophiuchus to the brilliant Scorpio with its red Antares now lying a little west of south, its long tail trailing downward to the horizon.

It used to be the generally accepted idea that this great rift in the Milky Way extending from Cygnus to Centaurus, a southern constellation which lies below the southern horizon, as well as the famous Coal Sack near the Southern Cross were true vacancies among the dense stars of the Milky Way. Now astronomers have evidence that they are enormous dark nebulae which cut off the light from stars beyond. Photographs of these dark objects show in fact a faint luminosity here and there so that one cannot consider them to be entirely non-luminous. Throughout the entire Milky Way region there are to be found countless of these dark markings in the form of lanes, rifts or holes in the midst of dense fields of stars and they are now recognized as dark or very faintly luminous tracts of nebulosity of enormous extent that lie between us and more distant stars.

In recent years an extensive photographic study of the Milky Way has been made by means of the Bruce telescope of the Harvard College Observatory at its southern station at Arequipa, Peru, where atmospheric conditions are particularly fine. Many of these dark markings have been photographed and the existence of a faint luminosity has been discovered in most of them. Interesting comparisons have also been made of the number of stars in a dense star field in Sagittarius and a region far exterior to the Milky Way and near its south pole in Cetus by means of star counts on photographs of the two regions. If the stars were everywhere as dense as they are in the Milky Way in the Sagittarius region it was found that there would be about two and a half billion stars down to the nineteenth magnitude in the entire heavens. If the density were equal to that near the south pole of the galaxy, on the other hand, there would be only twenty-three million stars visible down to this magnitude which is about the faintest that can be photographed. Among the brighter stars there were found to be only about two and a half times as many stars in a dense Milky Way region as there were in the exterior region but for extremely faint stars there were more than one hundred stars in the Milky Way region to every one in the exterior region.

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CHATS ON SCIENCE  
-----The Lioness and the Hare

By Dr. Edwin E. Slosson

Once upon a time, many years ago, a hare boasted of her large family to a lioness. The lioness admitted her quantitative deficiency but added that her one offspring was a lion. It was a conclusive retort - at the time. The lioness had no need to be disquieted by the success of her rival in maternity; indeed, she could rejoice in it, for there was no danger that the hares, however numerous, would crowd out the lions; on the contrary, if there were more hares, there would be more lions and better fed.

Now, however, conditions have so changed that the reply of the lioness is no longer satisfactory. We have put a stop to killing as a factor in the struggle for existence. The lion has his claws trimmed and his jaws muzzled by law. The battle is not to the strong, but the race is to the swift-breeder. The lion and the hare are compelled to live peaceably together and are placed on an equality. Questions are decided by counting noses, not by matching muscles or weighing brains. There is no reason to think that the propaganda of Neo-Malthusianism will ever influence the hares, nor that any legislative bonus will increase the size of leonine families. Consequently lions are becoming extinct and hares are multiplying all over the earth.

In its modern form, therefore, this fable teaches that the hares are bound to beat the lions in the long run, no matter how much bigger the latter may be or how much louder they can roar.

And having extracted this lesson of eugenics from the fable, drop it right here. A fable is a single-barreled weapon and if you attempt to get more than one shot out of it it is likely to explode, to the injury of the user. So I am not going to discuss whether the savage and predatory lion is a nobler beast than the meek and vegetarian hare and better fitted to populate the world. Still less am I going to identify with the lion and the hare any particular classes or races.

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The Ainus, a race which once occupied large sections of Japan, now number only about 20,000 individuals.

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Steps are being taken to manufacture insulin, the pancreatic extract used in treating diabetes, in Germany.

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One hundred and fifty million tons of wood waste are produced annually, most of which, it is claimed, finds no useful application.

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During the first half of this year the average daily production of electricity in the United States was nearly 23 per cent. over the average daily rate for the same period last year.  
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## ASTRONOMICAL APPARATUS READY FOR SUN ECLIPSE

Massive astronomical equipment to be used in observing the total solar eclipse of September 10 is now being transported from the Mount Wilson Observatory, Pasadena, Calif., to the Fort Rosecrans Military Reservation on the very tip of Point Loma, off San Diego Harbor. This will be the location of the central station of the Mount Wilson Observatory party in charge of Dr. Walter S. Adams, director.

The large structural steel framework with the two 30-foot photographic telescopes and numerous smaller attachments when erected at the station will make a novel sight for ships coming into the harbor.

This apparatus was constructed in the shops of the Observatory here and before transfer to Point Loma was set, adjusted, and tried out.

At the Point Loma station an attack will be made upon the outlying regions of the sun known as the corona, and photographs of the stars in the neighborhood of the sun will be secured for a study of the bending of the light rays. For this work a battery of ten or a dozen instruments including long focus cameras, radio-meters, interferometers, and spectrographs have been mounted temporarily on the equatorial framework designed originally for the new 50-foot interferometer for measuring the diameters of the stars. This framework forms an admirable mounting for the various instruments which are so arranged that each can be pointed directly at the sun and all moved together by a driving clock to follow the sun during the time of the eclipse.

Another Mt. Wilson party will be located at Lakeside, 20 miles east of San Diego, which is just within the region where the sunlight will be completely cut off. The observations at this edge-station will be quite different in character from those at Point Loma. At Lakeside a coelostat will be used to reflect the sunlight to the instruments, and by the use of several spectroscopes it is hoped to photograph in detail the spectrum of the gases in the sun's lower atmosphere throughout the entire visible spectrum.

The prospect for good weather and clear skies is very encouraging in Southern California at this time of the year.

In addition to the observations to be undertaken in the path of totality it is probable that valuable photographs of the spectrum of the chromosphere and edge of the sun can be made on Mount Wilson with the powerful instruments there available. Although the eclipse is not total on Mount Wilson and the corona will not be visible, the fact that over 98 per cent. of the sun's disk will be covered will afford an exceptionally favorable opportunity for accurate studies of the character of the spectrum of the sun in the narrow crescent still exposed.

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## AIRPLANE OBSERVATORIES MAY RECORD SUN'S ECLIPSE

Use of airplanes to photograph the mysterious rippling shadows which will probably flit across the landscape before and after the complete eclipse of the sun in southern California on September 10, has been proposed to the Superintendent of the U. S. Naval Observatory at Washington, by Col. John Millis, army engineer, astronomer, and physicist of Cleveland. Direct observation of the sun from the air is also suggested as valuable in case clouds or fog should obscure the view of astronomers working on the ground.

"Shadow bands", or a series of faint wavering parallel lines of light and shade a few inches wide have been frequently noticed dancing swiftly over the ground and the sides of houses from a few seconds to five minutes before and after solar eclipses become complete. Repeated efforts have been made to photograph this phenomena, with little success. Col. Millis, however, thinks that the use of the airplane may enable astronomers to obtain a record of these strange shadows.

He admits that the faintness of such shadows and their small size will diminish the prospects of success, but holds that by the use of films of a high degree of sensitiveness and such color screens or filters as are used in taking photographs from airplanes during twilight and on cloudy days may prove effective in obtaining the record. He also advises systematic preliminary drills and practice over both land and water in taking pictures which bring out such small details as small waves and ripples on water, shadows of picket fences on the ground, furrows of ploughed fields, or shingles on roofs.

Astronomers do not know the cause of the shadow bands but it has been supposed that they are due to undulations and disturbances of the density of the atmosphere caused by the drop in temperature within the cone of shadow formed when the moon passes between the earth and sun. More accurate records have long been sought in order to have more definite material on which to work out their cause than can be obtained from the vague and varying descriptions of observers of these fleeting shadows.

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## ABREVIATED CLOTHES INCREASE COLLEGE GIRLS' SIZE

Less and lighter clothing, more physical activity and bigger appetites, have made the college girls of today larger and stronger than those of three decades ago, Dr. Clelia Duell Mosher, medical adviser of women in Stanford University, declares in a report contained in the August 18 issue of the Journal of the American Medical Association.

She has analyzed the results of thousands of measurements made on women in three prominent colleges, Stanford, Vassar and Smith, and as a result believes that the increase in height and weight are due largely to the exercise indulged in and the more hygienic clothing worn by the modern woman. A study of the physical activities of women at Vassar shows that during the years 1896 to 1900 over a

quarter of the entering girls had engaged in no form of sport before entering college, whereas from 1916 to 1920 only six-tenths of one per cent. were so classified.

With increasing physical activity a change to lighter and looser clothing was made, and fashion was forced to adapt itself to the introduction of the bicycle and the automobile, says Dr. Mosher, who argues strongly for the change which has been made from "the voluminous skirt measuring from 9 to 15 feet in diameter which often weighed as much as 7 pounds" to the modern abbreviated, light weight garment.

The increased height and weight are explained by the argument that increased physical activity and lighter weight clothing cause increased appetite and permit better functioning of the bodily organs. "It is time," says Dr. Mosher, "that we cease thinking in terms of the unfitness and weakness of women. This splendid modern woman, grown taller and more vigorous because free from restricting fashions of dress, exercises more and consequently eats more, and has become better fitted to become the mother of fine sons and daughters, the promise of a stronger race."

During thirty years, 4,170 women who have passed through Stanford University show an increase of 1.2 inches in average height, Dr. Mosher found. Out of 7,064 women passing through Vassar in thirty-seven years, there is a gradual increase to 1.5 inches in height, and the same measurements are confirmed by the examination of 10,149 women during a period of twenty-two years at Smith.

#### TWO GIANT AIRSHIPS TO FLY AMERICAN COLORS THIS FALL

Two of the world's largest airships will be added to Uncle Sam's air force this fall. About September 1, the ZR-1, gigantic all-American built ship now being inflated with helium gas in its hangar at Lakehurst, N. J., will be launched, the Bureau of Aeronautics of the U. S. Navy Department has just announced. Sometime in November, the still larger ZR-3, now nearing completion in Germany, will probably be flown to this country for delivery to our government. Both ships are to have their home in the huge hangar at Lakehurst.

Hydrogen gas will be used by the German builders of the ZR-3 in the transatlantic flight to deliver the big ship. When turned over to the United States, it will be refilled with the non-explosive helium gas for actual service under the American flag.

The ZR-3 will be slightly larger and somewhat heavier in appearance than the ZR-1 built in this country. It will be 660 feet long, while the ZR-1 is 680 feet in length. But although twenty feet shorter, it will have a diameter of 92 feet as compared to 79 feet, the diameter of the ZR-1. It will have a total gas capacity of 2,400,000 cubic feet as against 2,100,000 cubic feet gas capacity of the American built ship. The German built craft will be driven by five Maybach 400 horsepower engines, while the power plant of the ZR-1 consists of six 200-300 horsepower Packard engines.

These two companion ships are both of the rigid zeppelin type of airship which consists of a girder framework of duralumin metal inside which are a series of some twenty gas bags or compartments, the whole being attached to a rigid keel which forms the main corridor of the ship on which are the quarters for the crew of about thirty men, gasoline tanks, and water ballast tanks.



## WORLD'S DAIRY CONGRESS COMES TO UNITED STATES IN OCTOBER

Work is nearing completion on the new \$500,000 coliseum at the State Fair grounds, Syracuse, N. Y., which will house next October the greatest exhibition of the dairy industry ever seen in the United States. The occasion will be the joint meeting of the National Dairy Exposition and the World's Dairy Congress which will take place from October 5 to 13.

This is the first time that the World's Dairy Congress, an international organization devoted to all the aspects of the dairy industry, has met in the United States. Preparatory to the sessions in                      meetings will be held in Washington and Philadelphia.                      Syracuse,

The sessions at Washington will be on October 2 and 3 when the delegates will be welcomed by high officials and scientists of the Government. The discussion there will deal with the broad international problems of the dairy industry, the importance of which has been increasingly recognized since the war.

Milk in its relation to public health will be discussed at the one day meeting at Philadelphia on October 4, at the conclusion of which the Congress will move to Syracuse where its sessions will be held jointly with the National Dairy Exposition. Mornings will be devoted to discussions and afternoons to visits to the comprehensive exhibits and to nearby points of interest in this locality, one of the greatest dairy sections of the United States.

The discussion of the relation of milk to the public health will be a new feature of the congress. Another departure will be the stressing of international economic and trade problems with especial reference to cooperative associations. Specialists in heredity will discuss the latest advances in the science of breeding, and the part bacteria play in the dairy industry will receive attention as will the diseases of cattle and the modern ways of combating them.

The exhibits of cattle and machinery will be the most extensive ever seen in America. Cattle will be judged in the new Coliseum seating 5,000 people. The machinery exhibit will occupy 100,000 square feet of space. The U. S. Department of Agriculture will have a large exhibit.

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FLAPPER'S FACIAL CAMOUFLAGE USED TO MAKE BIGGEST LENSES

The scandal is out! Government scientists use rouge! In announcing the completion of a pair of the largest lenses ever made from American optical glass, Director G. K. Burgess of the Bureau of Standards tells how it is used.

Be it said, however, on behalf of the experts, it is not for artificial blushes that they employ it. They use it to put the final finish to the lenses and not to their complexions. It takes a lot of care to get a piece of glass big enough and perfect enough to make a large optical lens. The glass is made in big pots and by slowly cooling for several weeks the experts have been able to get the one thousand pounds of glass in the pot out in one big piece. Extreme care and very slow cooling is required to get such a large piece of glass free from defects. When such a perfect piece is obtained, it is moulded to the proper shape and ground.

Then begins weeks of hand work to correct all errors of as much as a millionth of an inch. To make these fine corrections a little rouge is rubbed on, here and there, until the polish reaches perfection.

The Bureau of Standards has just completed a pair of 12 inch lenses which may be used for astronomical observations. The scientists claim that they will soon be able to make even larger lenses from American optical glass. Before the war, all glass for large lenses was imported from Europe.

These lenses form what is known as an achromatic combination; that is, one lens is of flint glass and the other of crown glass, and the combination is designed so as to bring light of all colors to a focus at the same point, whereas with a single lens the focus is different for different colors.

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#### TABLOID BOOK REVIEW

INTELLIGENCE TESTING. By Rudolf Pinter, Ph. D. Professor of Education in Teachers College, Columbia University. Henry Holt and Co. \$2.50

This is, the preface admits, an attempt to tell what is meant by intelligence testing, what means are employed to test general intelligence, and what results have been achieved. It is also guilty of being a text book and intending to ~~last~~ be of value to teachers. But the ordinary mortal who has not caught up with the recent growth of intelligence tests will have a chance through this book to find out what it is all about. He will see how these tests are to come into wider application.

W. D.

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"The Cherokees give their children a concoction of burs to strengthen their memories; for as a bur will stick to anything, the mind of a man with a bur inside him will cling to all kinds of useful information."

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Food should not be allowed to stand for even a short time in a galvanized iron bucket as some of the zinc coating on the bucket may be dissolved and zinc poisoning result from eating the food.

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So accurate is the work of American government assayists that many foreign countries are said to have large deposits of United States coinage bullion in their gold reserve in preference to that of their own manufacture.

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Mexico recently prohibited the importation of meat, hides, bones, and the raw products derived from animals shipped from districts where contagious animal diseases are known to exist.

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